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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

10/532458



Applicant's or agent's file reference 13301WO/hh	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/EP 03/11909	International filing date (day/month/year) 27.10.2003	Priority date (day/month/year) 25.10.2002
International Patent Classification (IPC) or both national classification and IPC F16H21/44		
Applicant SCHUKRA GERÄTEBAU AG et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of 6 sheets.

3. This report contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 05.03.2004	Date of completion of this report 13.12.2004
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Martinvalet, C-I Telephone No. +49 89 2399-8185 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP 03/11909

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-29 as originally filed

Claims, Numbers

1-17 received on 29.11.2004 with letter of 29.11.2004

Drawings, Sheets

1/8-8/8 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY
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International application No. **PCT/EP 03/11909**

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-17
	No: Claims	
Inventive step (IS)	Yes: Claims	1-17
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-17
	No: Claims	

2. Citations and explanations

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP 03/1 1909

Re Item V

Reasoned statement with regard to novelty and inventive step; citations and explanations supporting such statement

Reference is made to the following document:

D1: EP-A-0 754 591 (LEAR CORP ITALIA SPA) (1997-01-22)

Claim 1

The present application meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is new in the sense of Article 33(2) PCT.

The document **D1** is regarded as being the most relevant state of the art discloses: an adjustable lumbar support assembly (50) comprising an adjustable lumbar support member (52,58) and a bowden cable actuator for actuating a bowden cable (59).

The subject-matter of claim 1 differs from this known adjustable lumbar support assembly in that it comprises a transmission amplifier assembly comprises a bowden cable having two wire portions coupled to a rotary member being supported rotatably, the bowden cable with first wire portion being connected between the actuator and the amplifier, the second wire portion being connected between the amplifier and the lumbar support member.

The problem to be solved by the present invention may be regarded as facilitating the movement of the lumbar support member during its adjustment.

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons: the prior art documents DE 42 21 049 and US-A-5 360 086 suggesting the differencing features are referring to vehicle brakes, and in EP-A-0 754 591 to the head-rest of the vehicle seat.

Claims 2-17

Claims 2-15 dependent on claim1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

The method claims 16 and 17 are new and inventive in the sense of Articles 33(2) and 33(3) PCT.

Claims:

1. A transmission amplifier assembly for a bowden cable, comprising:

5 a transmission device (10; 10'; 10''; 10'''), the transmission device (10; 10'; 10''; 10''') being coupled to a first wire portion (52; 74) of a bowden cable (18; 70) and to a second wire portion (26; 74) such that movement of the first wire portion (52; 74) relative to a
10 sleeve (54; 72) of the bowden cable (18; 70) imparts movement of the second wire portion (26; 74) in accordance with a predetermined transmission ratio, the movement of the second wire portion (26; 74) being facilitated compared to the movement of the first wire
15 portion (52; 74) by the predetermined transmission ratio.

2. The transmission amplifier assembly according to claim 1, wherein the transmission device (10; 10'; 10''; 10''') is arranged such that the movement of the
20 first wire portion (52; 74) imparts the movement of the second wire portion (26; 74), which is increased by the predetermined transmission ratio with respect to the movement of the first wire portion (52; 74).

25 3. The transmission amplifier assembly according to claim 1 or 2, wherein the transmission device (10,

10', 10'') comprises first and second connection points
being movable relative to each other, the first
connection point being operatively connected to the
sleeve (54) of the bowden cable (18) and the second
5 connection point being operatively connected to the first
wire portion (52) of the bowden cable (18) in a manner
such that movement of the first wire portion (52)
relative to the sleeve (54) imparts movement of the first
connection point relative to the second connection point,
10 the transmission device (10, 10', 10'') also comprising
third and fourth connection points being movable relative
to each other, the fourth connection point being
operatively connected to the second wire portion (26) in
a manner such that movement of the third connection point
15 relative to the fourth connection point imparts movement
of the second wire portion (26) relative to the third
connection point, the first, second, third, and fourth
connection points being linked to each other.

20 4. The transmission amplifier assembly according
to claim 3, wherein said connection points are linked in
a manner such that movement of the first wire portion
(52) relative to the sleeve (54) causes non-proportional
movement of the second wire portion (52) relative to the
25 third connection point.

5. The transmission amplifier assembly according to claim 3 or claim 4, wherein the first wire portion (52) extends along a first path having a varying length between the first and second connection points and the second wire portion (26) extends along a second path having a varying length between the third and fourth connection points, a linkage between the first, second, third, and fourth connection points being such that a length of the second path increases as a length of the first path decreases.

6. The transmission amplifier assembly according to claim 5, wherein the linkage between the first, second, third, and fourth connection points is such that the length of the second path increases at a decreasing rate when the length of the first path is decreased at a constant rate.

7. The transmission amplifier assembly according to claim 5 or 6, wherein the first path extends straight between the first and second connection points and the second path extends straight between the third and fourth connection points, the first path being oriented at a right angle to the second path.

8. The transmission amplifier assembly according to any one of claims 3-7, further comprising:

first, second, third, and fourth connection members (30, 42; 30, 44; 60) and first, second, third, and fourth linking members (32; 62), the first, second, third, and fourth connection points being positioned on the first, second, third, and fourth connection members (30, 42; 30, 44; 60) respectively, the first linking member (32) directly linking the first connection member (30, 42; 60) to the third connection member (30, 44; 60), the second linking member (32) directly linking the first connection member (30, 42; 60) to the fourth connection member (30, 44; 60), the third linking member (32) directly linking the second connection member (30, 42; 60) to the third connection member (30, 44; 60), the fourth linking member (32) directly linking the second connection member (30, 42; 60) to the fourth connection member (30, 44; 60), each of the linking members (32) being configured and adapted to transmit compressional force between each of the connection members (30, 42; 30, 44; 60) of which it is directly linked.

9. The transmission amplifier assembly according to claim 8, wherein each of the linking members (32) is pinned to each of the connection members (30, 42; 30, 44; 60) of which it is directly linked.

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10. The transmission amplifier assembly according to any one of claims 3-8, wherein the transmission device (10, 10', 10'') is a single homogeneous monolithic part.

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11. The transmission amplifier assembly according to any one of claims 3-10, wherein the third connection point is operatively connected to a further sleeve (28) of a further bowden cable (20) and the further bowden
10 cable (20) comprises the second wire portion (26) moveable in the further sleeve (28) in a manner such that movement of the third connection point relative to the fourth connection point imparts movement of the second wire portion (26) relative to the further sleeve (28),
15 the first, second, third, and fourth connection points being linked to each other.

12. The transmission amplifier assembly according to claim 1 or 2, wherein the transmission device (10;
20 10') comprises a rotary member (82) being supported rotatably, the first wire portion (74) and the second wire portion (74) both being coupled to the rotary member (82) such that the movement of the first wire portion (74) imparts rotation of the rotary member (82) and
25 thereby the movement of the second wire portion (74).

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13. The transmission amplifier assembly according to claim 12, wherein the first wire portion (74) and the second wire portion (74) both are directly fixed at the rotary member (82).

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14. The transmission amplifier assembly according to claim 12 or 13, wherein the first wire portion (74) and the second wire portion (74) extend both along a periphery of the rotary member (82).

10

15. The transmission amplifier assembly according to claim 14, wherein the first wire portion (74) and the second wire portion (74) extend both along respective grooves formed in the periphery of the rotary member

15 (82).

16. The transmission amplifier assembly according to any one of claims 12-15, wherein the rotary member (82) has a substantially longitudinal shape.

20

17. The transmission amplifier assembly according to claim 16, wherein the rotary member (82) has a substantially elliptic shape.

25

18. The transmission amplifier assembly according to claim 14 or 15 and according to claim 16 or 17,

wherein the rotary member (82) has a substantially increasing width from a portion of the rotary member (82) where the first wire portion (74) leaves the periphery of the rotary member (82) to a portion of the rotary member
5 (82) where the second wire portion (74) leaves the periphery of the rotary member (82).

19. The transmission amplifier assembly according to any one of claims 12-18, wherein the rotary member
10 (82) is supported rotatably around a point of rotation (86), the point of rotation (86) being arranged eccentrically in a longitudinal direction of the rotary member (82).

15 20. The transmission amplifier assembly according to any one of claims 12-19, wherein the first wire portion and the second wire portion are formed by a single wire (74) movable in the sleeve (72) of the bowden cable (70).

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21. The transmission amplifier assembly according to any one of claims 12-20, wherein the sleeve (72) of the bowden cable (70) is held in place by a holding member (76).

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22. The transmission amplifier assembly according to any one of claims 12-21, wherein a guiding member (78) for guiding the first wire portion (74) towards the rotary member (82) and a guiding member (78) for guiding the second wire portion (74) from the rotary member (82) are provided.

23. The transmission amplifier assembly according to claim 22, wherein the guiding member for the first wire portion (74) and the guiding member for the second wire portion (74) are formed by a common guiding member (78).

24. The transmission amplifier assembly according to any one of claims 12-23, wherein the transmission device (10; 10'') is arranged such that a lever arm defined between the second wire portion (74) and a point of rotation (86) of the rotary member (82) is larger than a lever arm defined between the first wire portion (74) and the point of rotation (86) by the predetermined transmission ration.

25. An adjustable lumbar support assembly, the lumbar support assembly (12) comprising:

an adjustable lumbar support member (14);

a bowden cable actuator (16); and

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a transmission amplifier assembly (10; 10'; 10''; 10''') according to any one of the preceding claims, the bowden cable (18; 70) with the first wire portion (52; 74) being connected between the bowden cable actuator (16) and the transmission device (10; 10'; 10''; 10'''), the second wire portion (26; 74) being connected between the transmission device (10; 10'; 10''; 10''') and the adjustable lumbar support member (14).

10 26. The adjustable lumbar support assembly according to claim 25, wherein the transmission device (10; 10'; 10''; 10''') is attached to the adjustable lumbar support member (14).

15 27. A method of adjusting a lumbar support member, comprising the steps:

causing motion of a first wire portion (52; 74) of a bowden cable (18; 70) relative to a sleeve (54; 72) of the bowden cable (18; 70) via a bowden cable actuator
20 (16);

converting the motion of the first wire portion (52; 74) into motion of a second wire portion (26; 74) in accordance with a predetermined transmission ratio, the conversion being such that the motion of the second wire
25 portion (26; 74) being facilitated compared to the motion

of the first wire portion (52; 74) by the predetermined transmission ratio;

adjusting the lumbar support member (14) in response to the motion of the second wire portion (26; 74).

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28. The method according to claim 27, wherein the motion of the first wire portion (52; 74) is converted into the motion of the second wire portion (26; 74) using a transmission amplifier assembly according to any one of

10 claims 1-24.